

Some Harvestmen (Arachnida, Opiliones) from Taiwan. I. Phalangiidae, Leiobuninae

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ABSTRACT—New locality records are given for five species of harvestmen of the subfamily Leiobuninae (Phalangiidae, Palpatores) from Taiwan. *Leiobunum oharai* n. sp., related to *L. hikocola* Suzuki of the *curvipalpe*-group, is described from Shihou, near Mt. Alishan. Variation in coloration of *Leiobunum japonicum taiwanum* Suzuki is also briefly described.

INTRODUCTION

In his major work [1] on the Taiwanese species of harvestmen, Suzuki listed 25 species (28 forms, if two subspecies and an unidentified species are included), composed of eight species of the suborder Laniatores and 17 species of the suborder Palpatores. However, our knowledge of the opilionid fauna of Taiwan is still rather poor compared with that of Japan. During the examination of some opilionids, recently collected from Taiwan by my colleagues, I have found a few undescribed species as well as some species which are poorly collected. I will present here results for five species belonging to the subfamily Leiobuninae of the Phalangiidae, as the first paper in a serial work dealing with Taiwanese opilionids. A new species of the *Leiobunum curvipalpe*-group [2, 3] is also described.

The holotype and some voucher specimens are deposited in the National Science Museum, Tokyo (NSMT). Others are temporarily kept in my personal collection in Faculty of Education, Tottori University (NTC). Other abbreviations used: BL=Body length; CL=Cephalothorax length; FIL=Femur I (i.e., femur of first leg) length; Fe=femur; Pa=patella; Ti=tibia; Mt=metatarsus; Ta=tarsus.

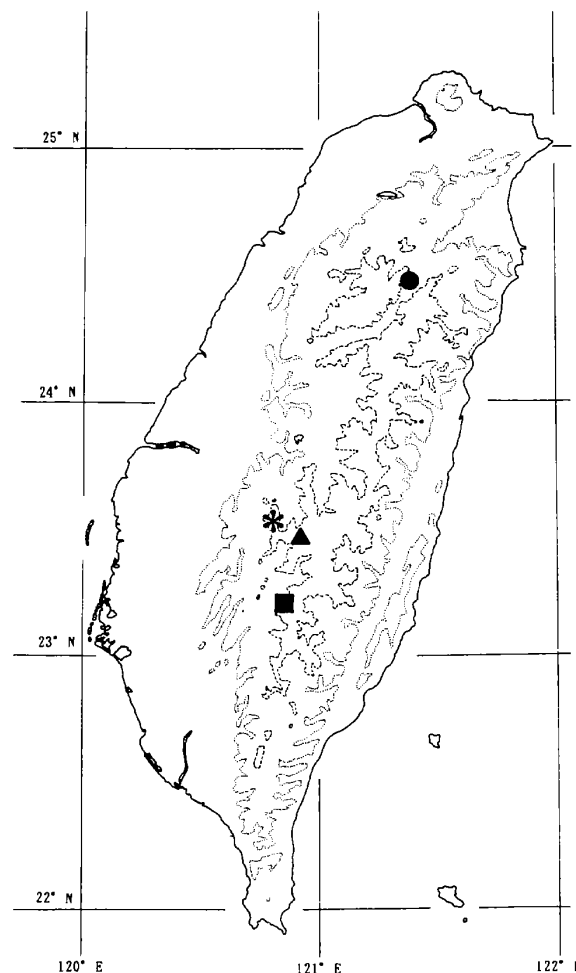


FIG. 1. Distribution of *Leiobunum maximum* Roewer (solid symbols) and *Leiobunum oharai* n. sp. (asterisk) in Taiwan. Synthesized previous records [1] and newly found localities. Subspecies of *L. maximum* are: *L. m. formosum* (circle); *L. m. yushan* (triangle); and present specimens whose subspecific designation is impossible (square). Dotted and broken lines denote contour lines for 500 m and 2,000 m in altitude, respectively.

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Family Phalangiidae
Subfamily Leiobuninae

***Leiobunum maximum* Roewer, 1910 (s. lat.)**
(Fig. 1)

Specimens examined. Hsiangyang (East of Mt. Guanshan), 2,140 m alt., 2 juv., 4-XI-1989, Y. Nishikawa [NTC].

Distribution. China (Fujian district), Taiwan (Fig. 1), Japan (The Ryukyus) [1, 2].

Remarks. This species, which was originally described from China by Roewer [4], has been divided into four subspecies, *maximum*, *formosum*, *yushan*, and *distinctum* [2]. Of these, two, *L. maximum formosum* Suzuki and *L. m. yushan* Suzuki, are distributed in Taiwan (Fig. 1). However, designation of the present material to the subspecific level was impossible because the specimens were too immature.

***Leiobunum oharai* n. sp.**
(Figs. 1–2)

Specimens examined. Shihou, near Mt. Alishan, 2 ♂ (holotype [NSMT] and paratype [NTC]), 9-IV-1986, M. Ôhara.

Description. **Male:** Body as shown in Figure 2A. Dorsal integument smooth, without any armatures. Cephalothorax wider than abdomen. Eye tubercle (Fig. 2B–C) separated by its length from the front margin of the cephalothorax, dorsally wider than long, laterally slightly and frontally conspicuously constricted at base; canaliculate above, with a small blunt tubercle on each carina (Fig. 2B). Labrum (Fig. 2D), simple but with several denticles on both lateral sides.

Venter. Surfaces of coxae I–IV and genital operculum only with sparse short hairs; free sternites likewise with a few sparse hairs.

Chelicera (Fig. 2E), normal; both segments dorsally with short hairs; distal segment armed distomesally with three or four denticles and several short hairs.

Palp (Fig. 2F), slender; femur slightly curved ventrally, distolaterally with several blackish-colored denticles; patella widened distally and with a distomesal blunt process; tibia slightly widened distally; tarsus slender, slightly curved ventrally,

armed ventrally with a row of small blackish-colored tubercles extending nearly full length of the segment.

Legs, long and slender; coxae without lateral rows of denticles; trochanters with a few denticles on both posterior and anterior sides; femora with minute scattered teeth uniformly; patellae with a few teeth above; remaining leg-segments only with fine hairs.

Penis. Shaft 1.79 mm long, 0.13 mm wide at base; glans 0.25 mm long, 0.39 mm at widest portion, stylus 0.06 mm long. Shaft slender, somewhat widened at middle part; alate part consisted of two parallel pairs of thin membranous processes, i.e., ventral alates and dorsal alates, to form lateral pouches (Fig. 2G).

Coloration. Body, in ethanol, cream-yellow finely specked with numerous dark-brown pigments. Pattern shown in Figure 2A. Eye tubercle cream-yellow with blackish brown ring around each eye. Venter uniformly cream-yellow except for somewhat darkened posterior rims of sternites. Chelicera cream-yellow. Palp cream-yellow except for the both lateral surfaces of femur partly specked with dark pigments. Legs brown.

Female. Unknown.

Measurements (in mm). Male holotype (male paratype in parentheses): cephalothorax 0.95 (1.04) long, 2.16 (2.25) wide; abdomen 2.00 (2.10) wide; total body length 3.12 (3.43). Femur I length: 5.7 (5.5).

Length of palp and legs of male holotype: Palp (Fe/Pa/Ti/Ta; total): 0.98/0.64/0.85/1.28; 3.75. Legs (Fe/Pa/Ti/Mt/Ta; total): Leg I: 5.7/1.1/5.8/8.2/8.2; 29.0. Leg II: 10.8/1.4/11.5/13.4/21.6; 58.7. Leg III: 5.6/1.2/5.6/8.8/8.4; 29.6. Leg IV: 7.5/1.2/7.5/11.8/13.6; 41.6.

Distribution. Known only from type locality (Fig. 1).

Etymology. The specific epithet is given in honor of Mr. Masahiro Ôhara who collected the specimens.

Remarks. This species is similar in many ways to *Leiobunum hikocola* Suzuki (which is distributed in Kyushu, Japan, as well as Is. Yaku, and Is. Amami-oshima of the Ryukyus). Hence, this species is considered to be the second member of the *hikocola*-subgroup of the *curvipalpe*-group [3].

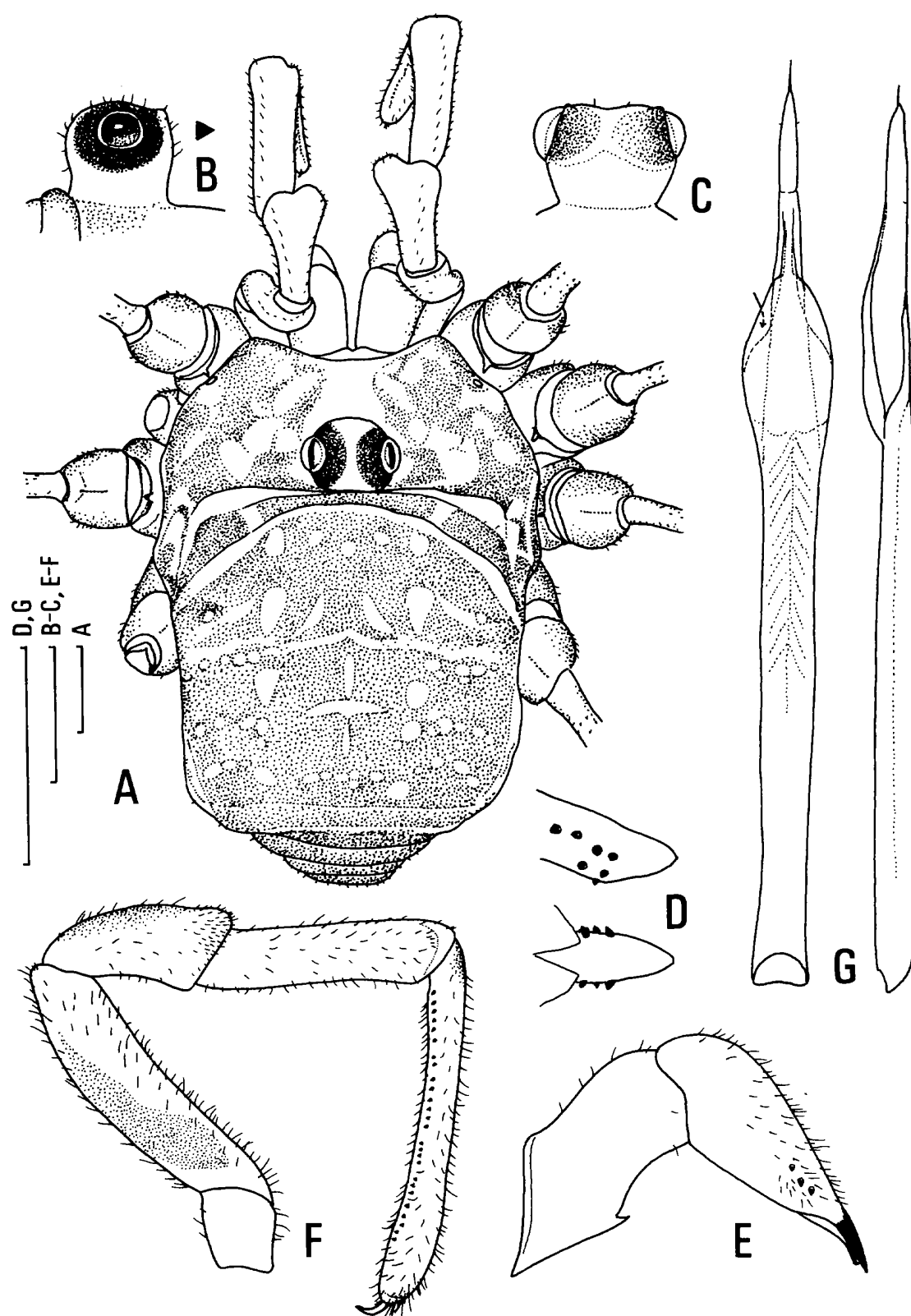


FIG. 2. *Leiobunum oharai* n. sp., holotype, male. A, Dorsal view of body. B-C, Right lateral (B) and frontal (C) views of eye tubercle. D, Lateral (above) and ventral (below) views of labrum. E, Mesal view of left chelicera. F, Mesal view of left palp. G, Ventral (left) and lateral (right) views of penis. Arrow indicates a gap made by ventral and dorsal alates. All scales=0.5 mm.

This species differs from *L. hikocola* by having a penis with laterally extended lateral pouches [cf. 3, 5], chelicerae with distomesal denticles, and an extensively pigmented body. Maturity in early April is also unique among the members of the *curvipalpe*-group which usually mature in July and August (Even its occurrence in the southernmost area of the distributional range of the group does not seem to account for this early maturity).

Leiobunum japonicum taiwanum Suzuki, 1977
(Figs. 3, 4A-B, 5)

Leiobunum japonicum japonicum: Suzuki, 1976 [2], p. 204 (in part), figs. 305–307.

Leiobunum japonicum taiwanum Suzuki, 1977 [1], p. 150, fig. 11A-B.

Specimens examined. Cuifeng, 2,000 m alt., 5 ♂, 26-VII-1986, S. Aoki. SW of Mt. Chinanshan (NE of Liugui), 1,700 m alt., 1 ♂, 1-XI-1989, Y. Nishikawa.

Measurements (in mm). Cuifeng population (5 males, means in parentheses): BL, 3.09–3.35 (3.21); CL, 1.03–1.27 (1.16); FIL, 8.3–9.2 (8.88).

Mt. Chinanshan population (1 male): BL, 3.38; CL, 1.14; FIL, 10.9.

Distribution. Taiwan (Fig. 5).

Remarks. One male specimen collected from Mt. Chinanshan differed from both the specimens from Cuifeng and the original description of the subspecies by Suzuki [1], in several respects. Namely, the whole legs including trochanters and a part of palp of a male from Chinanshan are considerably darkened. No such melanization has been reported in other specimens from Taiwan (compare Fig. 3A-B and 3C). The same male from Mt. Chinanshan also had a small spine on the second abdominal tergite (Fig. 3A-B). Although such a rudimentary spine occurs in this species (*s. lat.*), no conspecific specimens so far collected from Taiwan carried such a spine. The penis of the Chinanshan specimen is longer than those of Cuifeng population (Fig. 4A-B). These observations show the considerable geographic variation of this species within Taiwan.

Pseudogagrella cyanea (Roewer, 1915)
(Figs. 4C-D, 5)

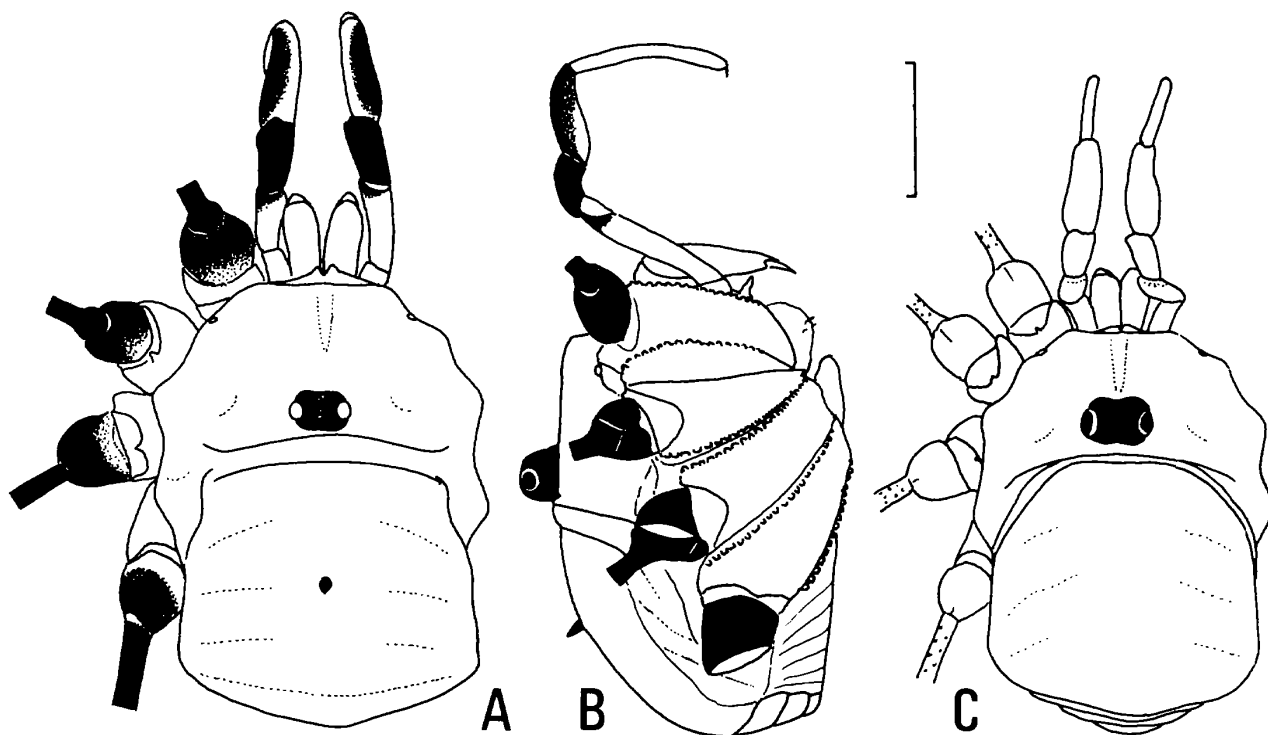


FIG. 3. *Leiobunum japonicum taiwanum* Suzuki. A-B, Dorsal (A) and lateral (B) views of male from Mt. Chinanshan. C, Dorsal view of male from Cuifeng. Scale=1 mm (All figures drawn to scale).

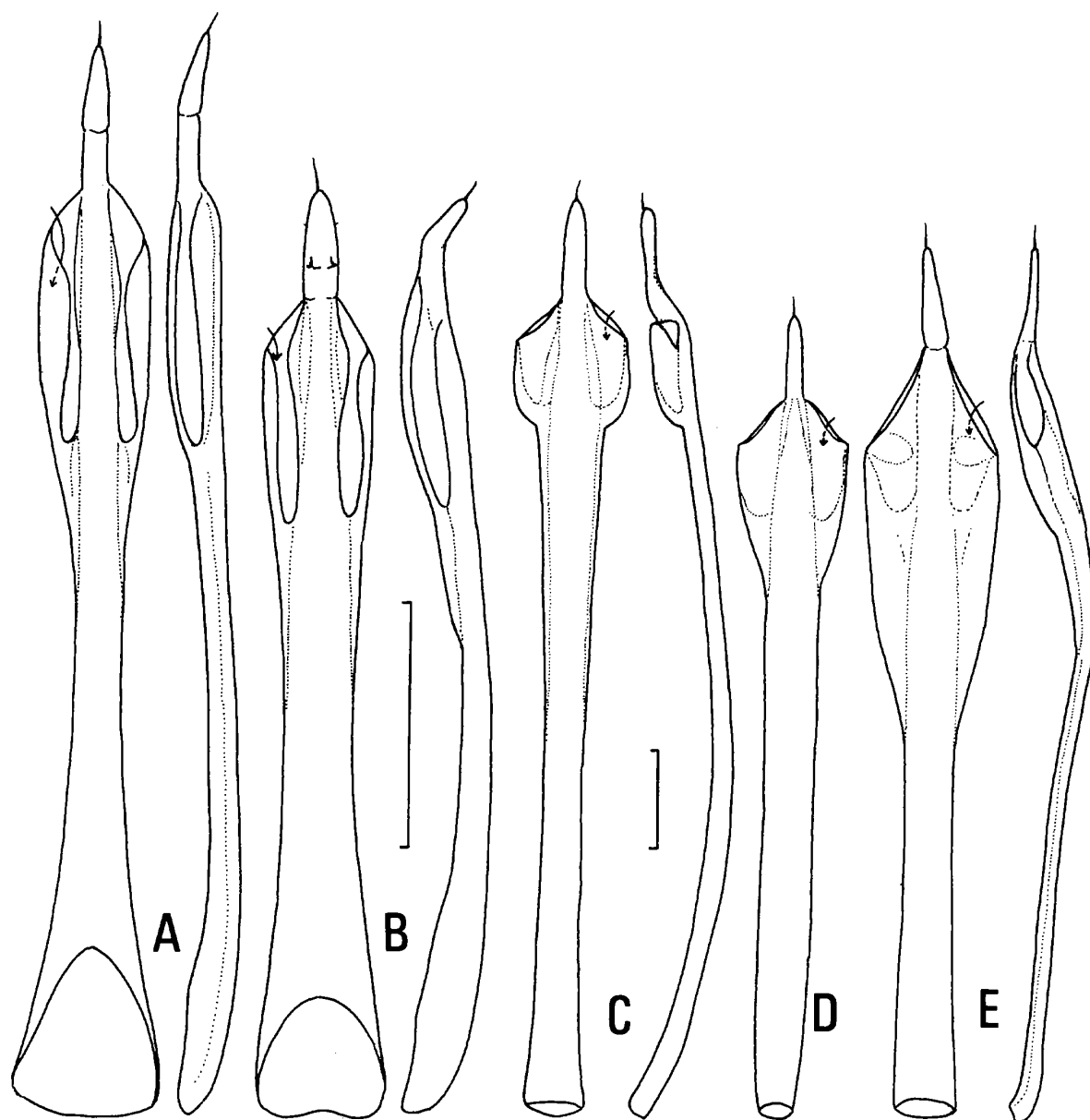


FIG. 4. Ventral (left) and lateral (right) views of penes of *Leiobunum japonicum taiwanum* Suzuki (A-B), *Pseudogagrella cyanea* (Roewer) (C-D), and *Pseudogagrella taiwana* Suzuki (E). Scales=0.5 mm (left scale for A-B, right for C-E). Localities (see Fig. 5): A, Mt. Chinanshan; B, Cuifeng; C, Jiuzu-Wenhua-Cun, near Yuchi; D, Tengchih; E, Mt. Yangmingshan.

Gagrella cyanea Roewer, 1915 [6], p. 142 [Type: Rokko, Taiwan]; 1923 [7], p. 991; 1954 [8], p. 228; Suzuki, 1944 [9], p. 250 (in part).

Gagrella formosae Roewer, 1915 [6], p. 143; 1923 [7], p. 991; 1954 [8], p. 226; Suzuki, 1944 [9], p. 252.

Pseudogagrella cyanea: Suzuki, 1974 [10], p. 137; 1977 [1], p. 141, figs. 8, 13B-E.

Pseudogagrella formosae: Suzuki, 1974 [10], p. 137.

Specimens examined. Mt. Anmashan-chuan (SW of Mts. Xiaoxueshan and Zhongxueshan), 2,250 m alt., 1 ♂, 20-X-1989, Y. Nishikawa [NSMT]. Rixuetan: Jiuzu-Wenhua-Cun near Yuchi, 1 ♂, 5-XI-1987, U. Kurosu [NTC]; Rixuetan, 1 ♂, 7-VI-1989, U. Kurosu; Shuishhe, 1 juv., 27-II-1988, U. Kurosu [NTC]. Tengchih (NE of Liubie), 1,550 m, 1 ♂, 31-X-1989, Y. Nishikawa [NSMT].

Measurements (in mm). Mt. Anmashan-chuan (1 male): BL, 4.5; CL, 2.0; FIL, 13.4. Rixuetan (1

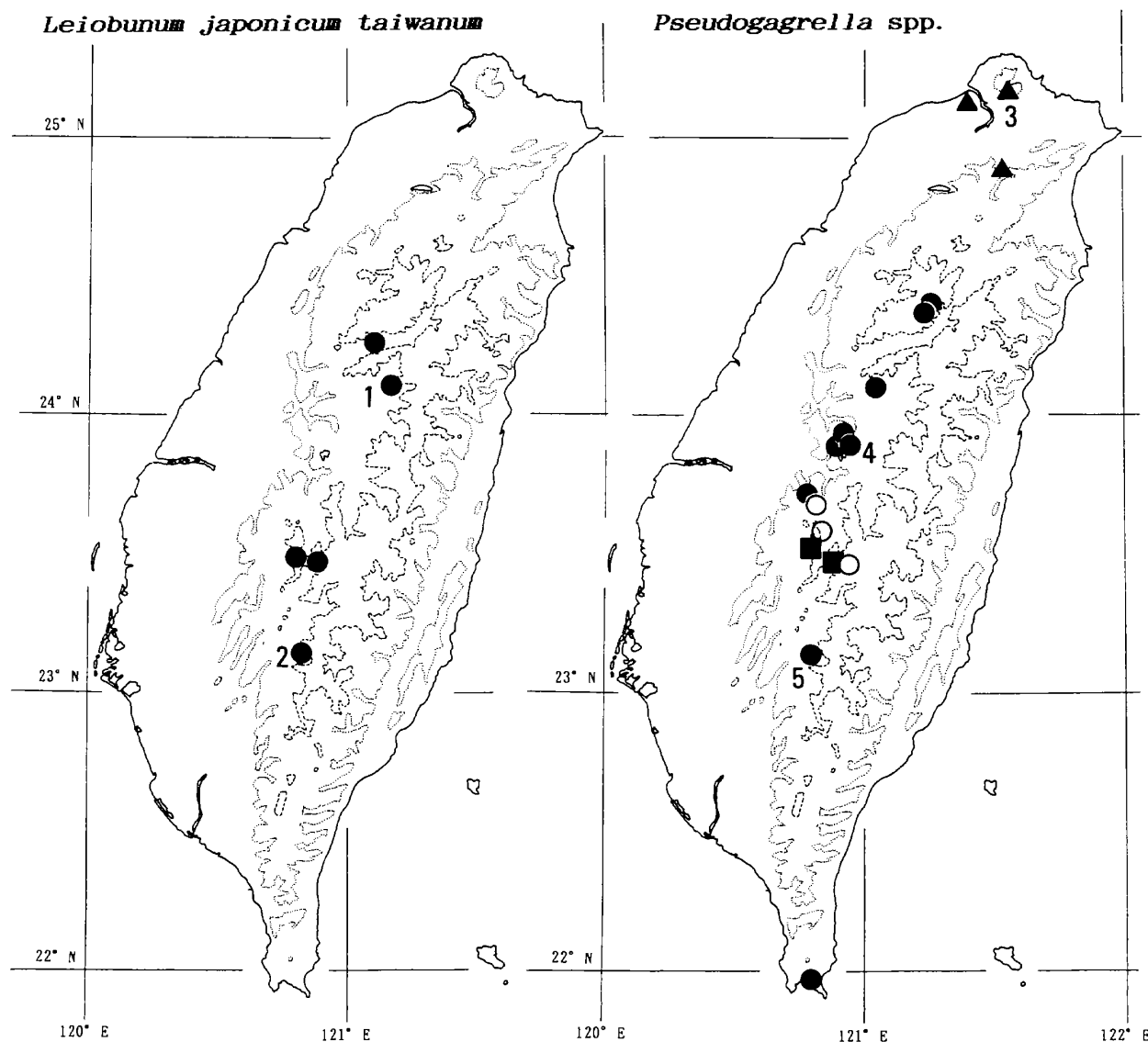


FIG. 5. Distribution of *Leiorbunum japonicum taiwanum* Suzuki (left) and four species of the genus *Pseudogagrella* (right) in Taiwan. Previous [1] and new records. *Pseudogagrella* spp. are: *P. cyanea* (Roewer) (solid circles); *P. taiwana* Suzuki (triangles); *P. arishana* Suzuki (squares); *P. andoi* Suzuki (open circles). Some localities with numbers: 1, Cuifeng; 2, Mt. Chinanshan; 3, Mt. Yangmingshan; 4, Jiuzu-Wenhua-Cun near Yuchi; 5, Tengchih. Other explanations in Fig. 1.

male): BL, 5.7; CL, 2.4; FIL, 15.2. Jiuzu-Wenhua-Cun: BL, 5.9; CL, 2.7; FIL, 13.8. Tengchih (1 male): BL, 5.3; CL, 2.0; FIL, 13.4.

Distribution. Throughout Taiwan excluding the northernmost area (Fig. 5).

Remarks. This species seems to be the most common harvestman in Taiwan. The penis varies somewhat in size and shape (Fig. 4C-D, see also fig. 8N-S in [1]). Collection data suggest that this species has a univoltine life cycle; overwintering as juveniles, with adults occurring from April/May to November.

***Pseudogagrella taiwana* Suzuki, 1977**
(Figs. 4E, 5)

Pseudogagrella taiwana Suzuki, 1977 [1], p. 144, fig. 9. [Type-locality: Mt. Yangmingshan, Taipei]

Specimens examined. Taipei, Mt. Yangmingshan, 6 ♂ 2 ♀ [1 ♂ NSMT, others in NTC], 19-VIII-1989, M. Ôhara.

Measurements (in mm): Mt. Yangmingshan population: males (n=6, means in parentheses): BL, 5.4–6.5 (6.0); CL, 2.2–2.7 (2.5); FIL, 14.1–

15.7 (14.7). Females (n=2, means in parentheses): BL, 6.7–6.7 (6.7); CL, 2.7–2.7 (2.7); FIL, 13.0–13.5 (13.3).

Distribution. Northernmost part of Taiwan (Fig. 5).

Remarks. The recently collected specimens from the type locality agree well (including penis, Fig. 4E) with the original description by Suzuki [1]. No substantial morphological differences could be detected between this species and *P. cyanea* except in the penis structure.

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